Volume 04, Issue 02 (March-April 2021), PP 14-20 www.ijmsdr.org
ISSN: 2581-902X

International Journal of Medical Science and Dental Research

Dental Caries Experience and oral Health-Related Quality of Life among 5-12-Year-old Children in Riyadh City, Saudi Arabia

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Abstract

Aim: The study aimed to evaluate the impact of dental caries on Oral Health-Related Quality of Life (OHRQoL) among 5-12 years children seeking dental care at private dental college clinics in Riyadh City, Saudi Arabia. ***Methods:*** It was a descriptive-analytic, cross-sectional study conducted among a sample of 5-12 year children seeking dental care at the private university hospital, Riyadh, Saudi Arabia. The dft and DMFT scores were recorded in primary and permanent teeth using WHO criteria. The children's parents completed the Early Childhood Oral Health Impact Scale (ECOHIS).In this study, 245 children aged 5 to 12 years were evaluated for dft and DMFT score. ***Results:*** The mean dft index (decayed, filled teeth) in primary teeth was 5.16±2.81, DMFT (Decayed, Missing, Filled Teeth) in permanent teeth was 1.43±1.64. The mean score of oral health-related quality of life was 24.88±7.94. The dft and DMFT scores differed significantly across different age groups ($p<0.001$). A significant positive correlation between DMFT score and ECOHIS score was observed ($r=0.184$, $p=0.004$). ***Conclusion:*** Dental caries affected the 5-12 year children's oral health-related quality of life. The effect of caries in permanent teeth has a significant relationship with the OHRQoL in children seeking dental care at private university dental clinics.

Keywords: children, dental caries, dft, DMFT, ECOHIS, oral health-related quality of life.

I. INTRODUCTION

Dental decay is a frequent non-communicable disease that affects 60-90% of children worldwide [1]. Dental caries is a chronic infectious disease capable of affecting infants, children, adults, and the elderly of all ages. The consequences of caries can have an inflammatory effect on the dental pulp and associated tissues leading to tooth loss, cellulitis, and sometimes brain abscess [2]. Recent reports have suggested that the untreated caries of the permanent teeth is the most prevalent condition worldwide. Besides, untreated dental caries of deciduous teeth is the tenth most prevalent condition reported in the global burden disease study [3]. Untreated tooth decay can badly affect children's quality of life [4].

A variety of indices presented to reveal the different patterns of dental caries throughout the world. The DMF Index has been a valid, reliable, and widely used index to measure coronal dental caries. The index generates a DMFT score or a DMFS score depending on whether data is gathered at tooth level or surface-level,

respectively. The deciduous dentition is reported separately in lowercase letters. The DMF index can be used to describe caries prevalence and caries severity [5].

The English version of ECOHIS was initially developed by Pahel, who demonstrated its validity and reliability. It has 13 questions divided into child and family impact segments. The child impact segment covers nine items, including child symptoms, function, psychology, self-image, and social interaction. The family impact section contains parental distress and family function domains consisting of four questions[6]. Recently, an Arabic version of ECOHIS developed by Farsi et al. has shown adequate validity and reliability when used among preschool children's Arabic caregivers[7].

The secular trends have shown an increase in dental caries during the past few decades in Saudi Arabia (Al-Ansari, 2014). Apart from negatively affecting children's quality of life, dental caries may also have a detrimental impact on family functioning by interfering with parent's and caregivers' everyday lives (Fernandes et al., 2017). Hence, the study's purpose was to evaluate the impact of dental caries on Oral Health-Related Quality of Life (OHRQoL) among 5-12 years children seeking dental care at private dental college clinicsRiyadh City,Saudi Arabia.

II. MATERIALS AND METHODS

1. Ethical approval

The study proposal was submitted to Riyadh Elm University's research center (FRP/2021/342), and ethical approval was obtained. Informed consent wastaken from the accompanied parents (mother/father) to examine the child.

2. Study sample and design:

A sample size 245 was decided based on thealpha error probability of (α =0.05), Power (1-β = 0.95), and an Effect size (=0.225). The sample size was calculated using G power version 3.1.9.6.

A cross-section descriptive study was carried out among pediatric patients and their parents/caregivers seeking dental treatment from Namuthajiya, AlOlaya, and Munasiya dental campuses of Riyadh Elm University, Riyadh, Saudi Arabia.

Child patients aged 5-12 years whose parents could easily speak and write Arabic were selected. While children with systemic diseases or taking medication, parents who failed to complete the questionnaires were excluded from the study

3. Questionnaires and data collection

The researcher explained the study's purpose to the parents/caregivers, and consent to participate in the study was obtained. The parents completed the Arabic version of the Early Childhood Oral Health Impact Scale (ECOHIS) in the clinic's waiting areas. The ECOHIS questionnaire comprises 13 items, classified into two sections: impact on children and parents' impact. The initial nine items investigated the impact of the children's oral health, such as eating, sleeping, and talking. The second part, impact on parents, has four questions, two on parents' concerns (2 questions) and two on parents' functions. The questionnaire item response options included "never," "hardly ever," "occasionally," "often," "very often," and "do not know, which received a score of 0 to 5, respectively. Overall, the total score of the ECOHIS index ranges from 0 to 52, with a higher total score indicating more oral health problems and less oral health-related quality of life.

4. Oral examination of the children

A single trained investigator performed Intraoral examinations of the children to measure caries in primary dentition using decayed, filled teeth (dft) and permanent dentition Decayed, Missing, Filled Teeth (DMFT). The examination conducted using the disposable dental mirror, dental explorer, sterile gauze, and mask based on World Health Organization criteria for the diagnosis of caries. Intra examiner reliability was calculated by Kappa statistics, which was found to be 0.85.

All the clinical examination was carried out while the child seated in a dental chair using artificial light. The dental intern was trained to record codes of DMFT in a proforma.

5. Statistical analysis

Descriptive statistics of mean, standard deviation, frequency distribution, and percentages were calculated for the data. Shapiro-Wilk test indicated the non-normal distribution of the data. Hence non-parametric tests of Mann-Whitney U, Kruskal-Wallis, and Spearman's correlation tests were applied to the data. All the analyses were performed using IBM-SPSS software version 25 (Armonk, NY: USA). A value of $p<0.05$ was considered significant for all the statistical purposes.

III. RESULTS

A total of 245 children aged 5-12 years and their parents/caregivers participated in this study. Most of the children were Saudi nationals (89.4%), with their father being employed in government services (63.3%), and mothers being a homemaker (61.6%). Most fathers (45.3%) and mothers (48.6%) had a bachelor's education level. Most of the parents/caregivers had a family income of >15000 SAR. The socioeconomic variables are shown in (Table 1).

Table 1: Socioeconomic variables of the parents/caregivers (n=245)

Variables		n	%
Nationlity	Saudi	219	89.4%
	Non-Saudi	26	10.6%
Father's occupation	Not working	28	11.4%
	Government service	155	63.3%
	Private service	62	25.3%
Mother's Occupation	Homemaker	151	61.6%
	Government service	67	27.3%
	Private service	27	11.0%
Father's Education	Primary	13	5.3%
	Intermediate	12	4.9%
	Secondary	72	29.4%
	Diploma	37	15.1%
	Bachelor	111	45.3%
Mother's Education	Primary	20	8.2%
	Intermediate	24	9.8%
	Secondary	65	26.5%
	Diploma	17	6.9%
	Bachelor	119	48.6%
Monthly Family income (Saudi Arabian Riyals)	Less than 3000	36	14.7%
	3000-6000	25	10.2%
	6001--9000	38	15.5%
	9001-12000	37	15.1%
	12001-15000	41	16.7%
	Above 15000	68	27.8%

The mean and standard deviation values of dft, DMFT, and ECOHIS scores are displayed (Table 2). An overall dft, DMFT, and ECOHIS scores of 5.16±2.81, 1.43±1.64, and 24.88±7.94 were observed in the study sample. The highest dft score of 7.13±2.24 was observed among children aged 5 years, and it reduced at subsequent years until it became 1±1.28 at 12 years. A comparison of mean dft scores across different age groups of the children using the Kruskal-Wallis test showed a statistically significant difference (p<0.001). Similarly, the lowest mean DMFT score of 0.20±0.62 was observed at 6 years, and it increased gradually to become highest at 11 years. When the mean DMFT scores were compared across different age groups, a statistically significant difference was observed (p<**0.001**). The lowest ECOHIS score of 22.20±6.58 was found at 6 years of age, while the highest was 12 years. The mean ECOHIS scores across different age groups did not show any statistically significant difference (p=0.106). Males 5.35±2.88 showed higher dft score in primary dentition than females 4.96±2.73, without any significant difference (p=0.203). On the contrary, females (1.63±1.62) had a higher DMFT score than males (1.25±1.64), and the difference was statistically significant (p=0.048). The mean ECOHIS score was higher among males (25.00±8.09) than females (24.75±7.81), without any statistically significant difference (p=0.999)

Table 2: The dft, DMFT, and ECOHIS scores based on age and gender of the children

		dft score			DMFTscore			ECOHIS score		
Variable		**Mean**	**SD**	**p**	**Mean**	**SD**	**p**	**Mean**	**SD**	**p**
Age (Years)	5	7.13	2.24		0.25	0.98		23.75	9.06	
	6	6.20	2.50		0.20	0.62		22.20	6.58	
	7	6.14	1.58		0.64	0.83		28.43	9.90	
	8	5.00	2.91	**<0.001**	1.08	1.49	**<0.001**	25.49	9.44	0.106
	9	5.41	2.57		1.76	1.61		25.59	7.37	
	10	3.83	3.01		2.33	2.00		22.50	4.39	
	11	4.44	2.26		2.78	1.25		25.11	7.07	
	12	1.00	1.28		2.50	0.90		25.75	6.82	
	Overall	5.16	2.81		1.43	1.64		24.88	7.94	
Gender	Male	5.35	2.88	0.203	1.25	1.64	**0.048**	25.00	8.09	0.999
	Female	4.96	2.73		1.63	1.62		24.75	7.81	
	Overall	5.16	2.81		1.43	1.64		24.88	7.94	

Spearman's correlation statistics showed a significantly positive correlation between DMFT score and ECOHIS score (r=0.184, p=0.004). On the contrary, the dft score showed an insignificant positive correlation with ECOHIS scores (r=0.123, p=0.055) (Table 3).

Table 3: Correlation of DMFT and dft scores with ECOHIS score

Spearman's correlation		DMFT score	dft score	ECOHIS score
DMFT score	Correlation Coefficient	1.000	-.434**	0.184**
	p	.	.000	**0.004**
dft score	Correlation Coefficient		1.000	0.123
	p		.	0.055
ECOHIS score	Correlation Coefficient			1.000
	p			.

**. Correlation is significant at the 0.01 level (2-tailed).

IV. DISCUSSION

In this study, the OHRQoL of 5-12 years children affected by dental caries in primary and permanent teeth was reported from a teaching hospital in Riyadh City, Saudi Arabia. The present study showed a mean score of ECOHIS was 24.88±7.94 in 5-12 years children, which is in line with previously conducted studies among preschool children in which ECOHIS score ranged between 4.07 ±0.79 to 19.46 ±8.42 [10–13]. However, this study indicated a higher ECOHIS score compared to the studies mentioned above. Our results and previous studies' differences can be explained by using different response scores and ECOHIS score analysis. According to the original questionnaire (ECOHIS) [6] were used in the current study, and the scores ranged from 0-4. Hence the total scores ranged from 0-52. However, in other studies mentioned above, the response scores from1to 5, total scores ranged from 13 to 65. Provided that a lower score suggests a higher oral health-related quality of life, the children seem to have a comparatively fair OHRQoL.

In our study, the mean dft index was 5.16±2.81, and the DMFT score was 1.43±1.64. At the same time, other studies conducted in different parts of the world showed mean dft scores of 3.93±4.22 in Iran [13], 1.54±2.47 in Mexico[14], and 2.1±3.1 in Brazil [15]. These results suggest that children who participated in our study had higher caries experience in primary teeth and poorer dental health than the above-quoted studies.

The present study findings showed that with an increase in the mean dft and DMFT index scores, the total ECOHIS score increased accordingly. Our results are in line with previous studies that assessed the impact of caries on primary teeth and oral health-related quality of life [16–18]. The effect of permanent teeth caries on oral health-related quality of life was more significant among 5-12 children. It has been reported that severe and simple early childhood caries can lead to children's aesthetic and functional problems that may affect the parents' day-to-day life [17].

Parental education seems to play an essential role in their children's oral health-related quality of life. It has been reported that children from well-off and well-educated families have improved oral health-related quality of life [19]. Children with less-educated fathers have higher dmft scores and a lower oral health-related quality of life [20]. In our study, most of the parents had bachelor's educational level and higher family income levels. However, no such relationship was explored in this study.

The previous study discovered no significant difference in the impact of oral health on quality of life between males and females [11], which is close to the current study findings. The possible explanation is that the children examined in this sample were very young, and gender variations in these children's perception of oral health's aesthetic features could not have yet affected their understanding [13]. Moreover, studies have reported a significant association between OHRQoL and the children's age [13,21]. Our finding coincides with these reported studies. The effect of oral health on quality of life increased with age without any significant difference. The reality may clarify that their teeth are more likely to be subjected to oral disease risk factors[13].

Unlike other studies, our study also has some limitations, such as; obtaining cooperation for dental examination from the children and parent/caregiver's refusal to answer the questionnaire. Moreover, the present study was carried out only among children aged 5-12 years attending single private university dental clinics. Hence caution should be taken while generalizing the study findings. In the future, community-based studies would be required to assess the oral health-related quality of life of children in Saudi Arabia by considering the wide range of factors to validate the present study results.

V. CONCLUSION

Dental caries affected the 5-12 year children's oral health-related quality of life. The effect of caries in permanent teeth has a significant relationship with the OHRQoL in children seeking dental care at private university dental clinics. These findings should be considered in the preventive dental care of 5-12 years children.

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